Outlets; Designing for More than Adequate

Drainage Management Workshop
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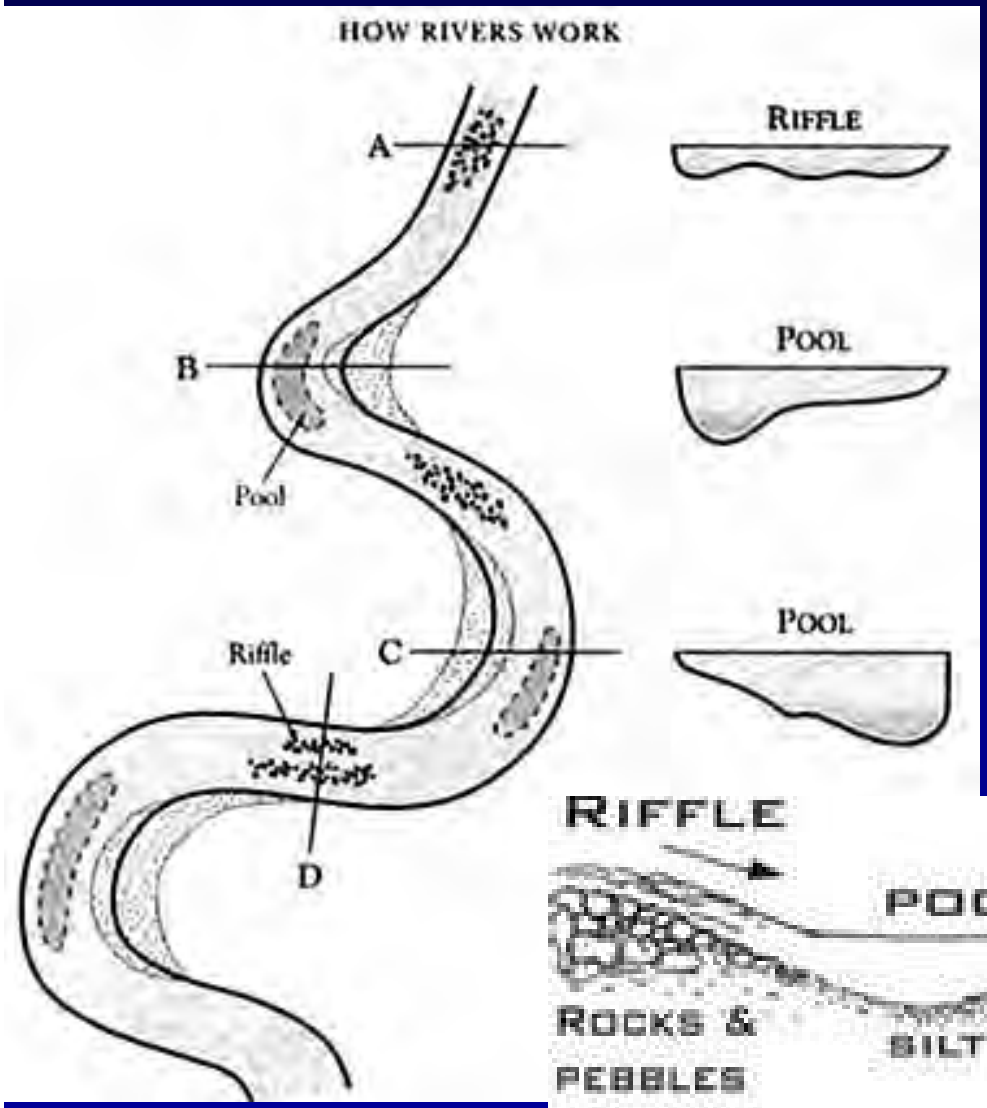
More than Adequate

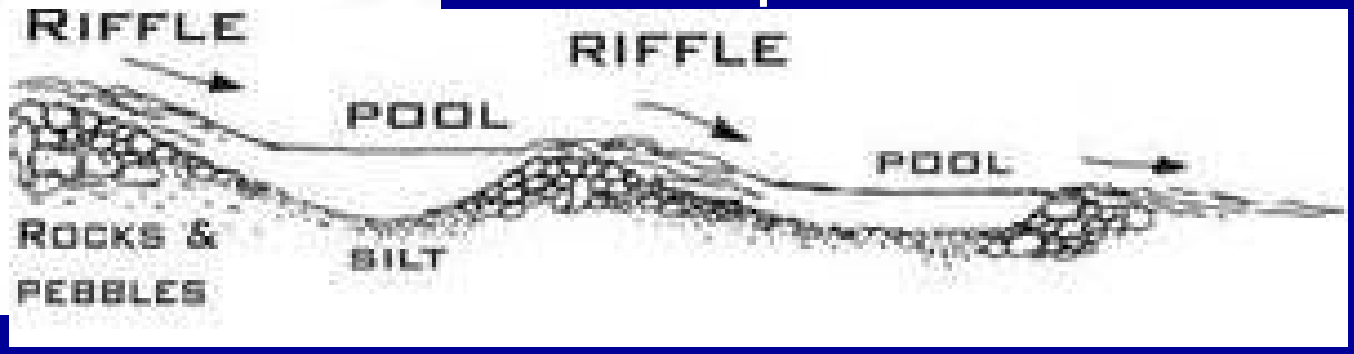
- Employ BMP's for tile systems
- Tile outlets are common to every system
- Outlets to Public Waters are largely deregulated
- Take Home:
- Outlet design for stability, longevity and positive water quality

CLEAN WATER LAND & LEGACY AMENDMENT

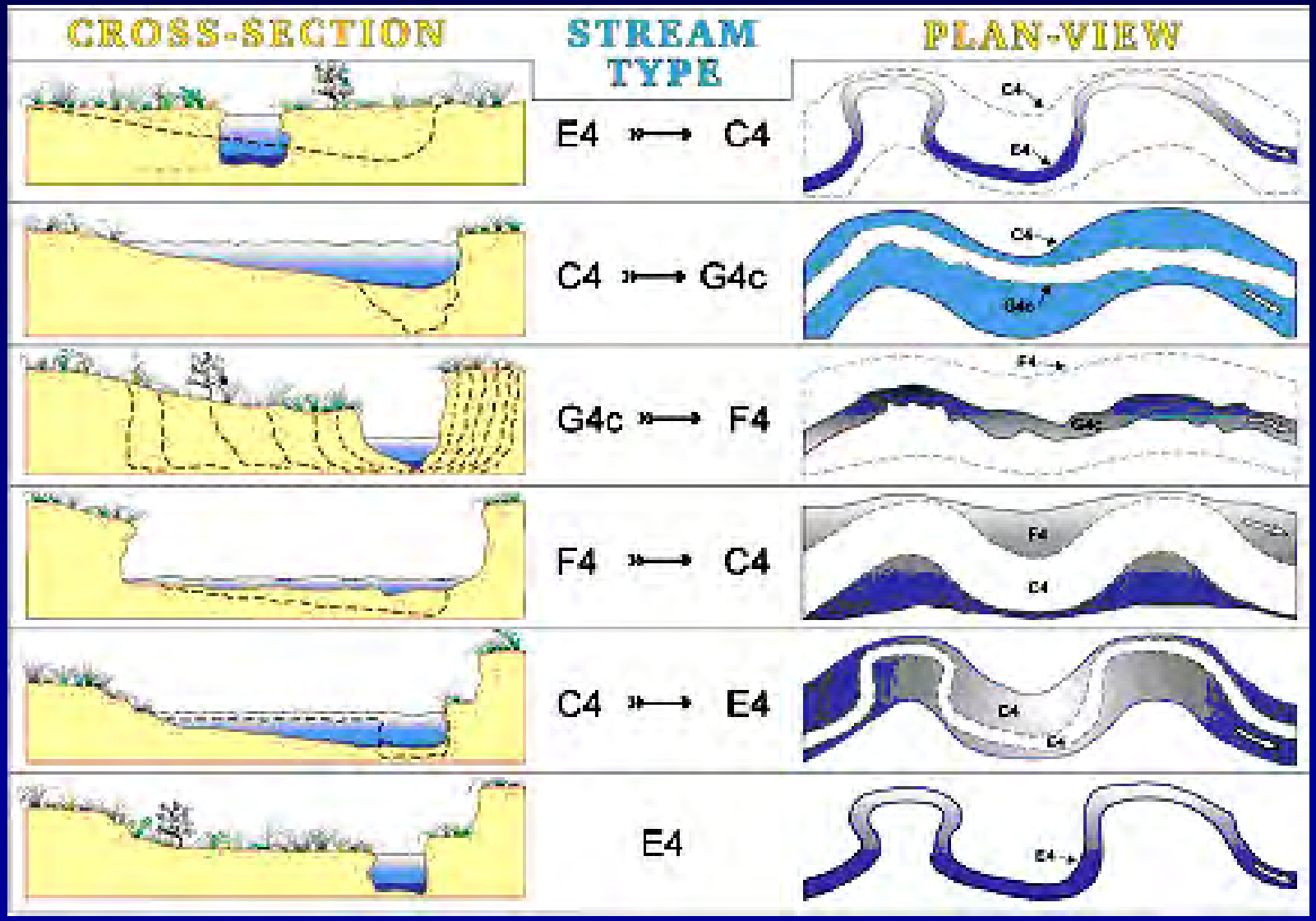
Stream Processes



- Dynamic system
- Stable
  - Self-forming
  - Self maintaining
- Unstable
  - Flow change
  - Impacts



Stream Processes



CLEAN WATER LAND & LEGACY AMENDMENT

Outlet Considerations

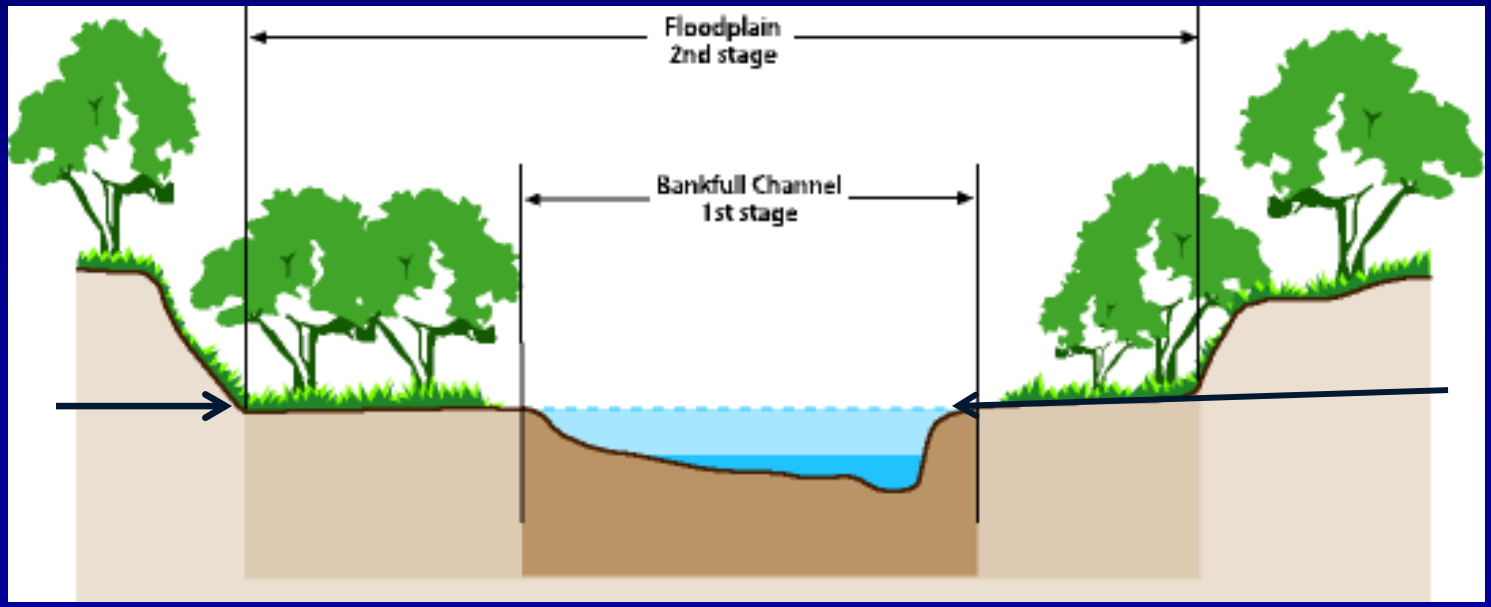
- Depth
- Grade
- Location
- Angle compared to stream flow

Outlet Depth

- Too high
  - Gully
- Too low
  - Forced outlet
- Relates to tile depth and grade in field

Outlet Depth

- Target: Bankfull Elevation
  - Bankfull: incipient point of flooding, 1.2-1.5 year return interval



Outlet Depth

- Two examples of bankfull depth outlets

Outlet Grade

- Grade determines velocity
- Limiting velocity will ensure stability of discharge point

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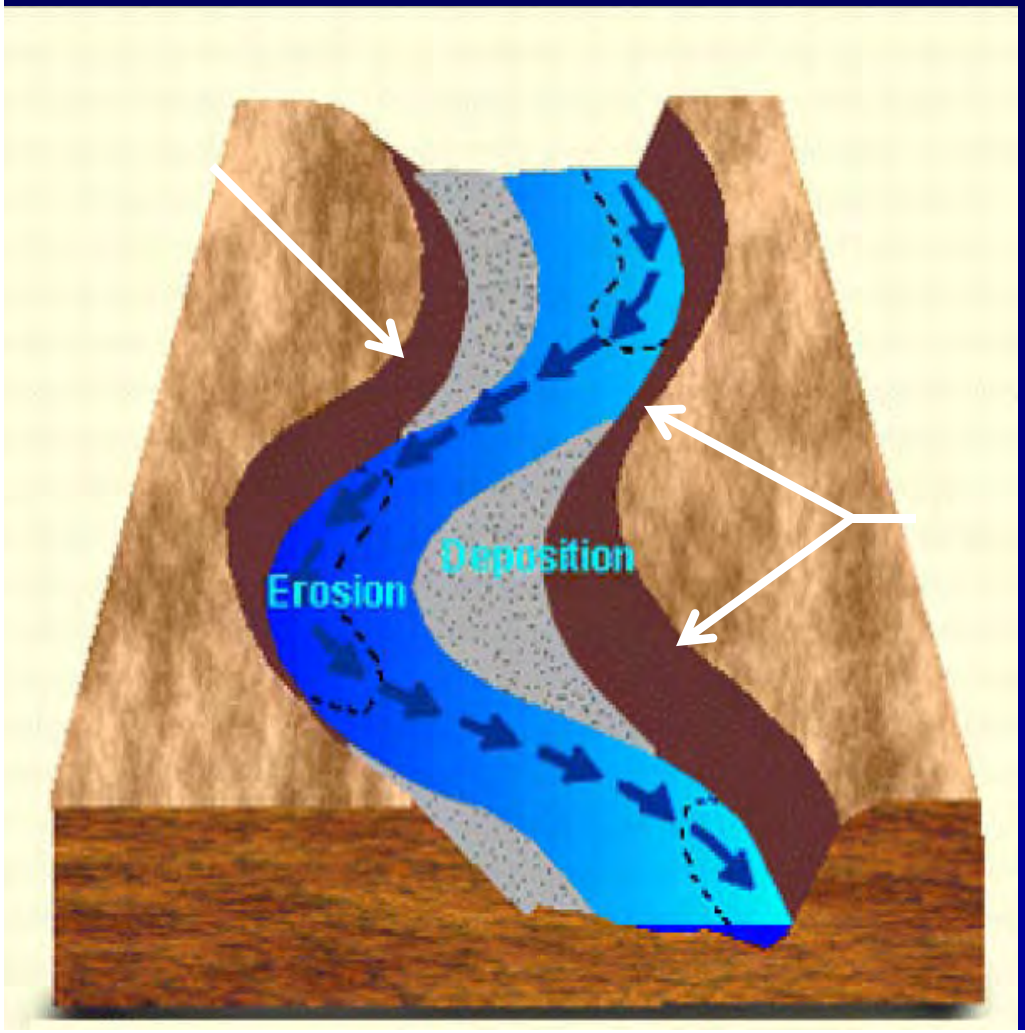
Outlet Location



- Targets:
  - Riffle
  - Straight reach
- Avoid:
  - Outside meander curve
  - Areas of predictable instability
  - Gully heads

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Outlet Angle

- Outlet may cause “waterfall” affect at high flows as water falls over the tile, forcing water into the bank behind it. Therefore, want only a slight angle downstream

Albin Case Study

- Depth: at bankfull elevation through Toe wood sod mat
  - Bioreactor, saturated buffer, etc.
- Grade: ~.1'/100'
- Location: at unstable bank…
  - Property Line
  - CRP contracts
- New location: at stabilized bank
- Angle: ~20° downstream

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